

5.0 WATER QUALITY CRITERIA

5.1 State Standards -

Projects shall be designed and operated so that off-site discharges will meet State water quality standards, as set forth in Chapter 17-302, Florida Administrative Code.

5.2 Retention / Detention Criteria -

5.2.1 Volumetric Requirements

- (a) Retention, detention, or both retention and detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof:

1. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater.
2. Dry detention volume shall be provided equal to 75 percent of the above amounts computed for wet detention.
3. Retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a guarantee of long term operation and maintenance of system bleed-down ability. Examples of such guarantee include evidence of excellent soil percolation rates, such as coastal ridge sands, or an operations entity which specifically reserves funds for operation, maintenance and replacement (example: Orange County MSTU). (NOTE: Orange County subdivision regulation criteria for retention - published by Orange County in Orange County Subdivision Regulations - may be utilized for Orange County MSTU projects in lieu of District retention criteria where retention volumes exceed one half inch. This information is hereby published by reference and incorporated into this rule.)

- (b) Systems with inlets in grassed areas will be credited with up to 0.2 inches of the required wet detention amount for the contributing areas. Full credit will be based on a ratio of 10:1 impervious area (paved or building area) to pervious area (i.e. the grassed area) with proportionately less credit granted for greater ratios.

5.2.2 Land Use and Coverage Criteria

- (a) Commercial or industrial zoned projects shall provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention, unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system. Such assurances include, for example, deed restrictions on property planned for re-sale, type of occupancy,

recorded lease agreements, local government restrictive codes, ordinances, licenses, and engineered containment systems.

- (b) Projects having greater than 40% impervious area and which discharge directly to the following receiving waters shall provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention. Receiving waters being addressed are:

1. Lake Okeechobee and the Kissimmee River.
2. Water bodies designated as Class I or Class II waters by the Florida Department of Environmental Protection.
3. Canals back-pumped to Lake Okeechobee or to the Conservation areas, or proposed for back-pumping.
4. Other areas, such as the Savannas in St. Lucie and Martin Counties; the Six Mile Cypress Strand; the Big Cypress area of Collier County; and lands acquired by the District pursuant to Section 373.59, Florida Statutes, Water Management Lands Trust Fund (Save Our Rivers); mitigation bank lands, as set forth in Section 4.4, "Environmental Resource Permit Applications within South Florida Water District - August 1995".
5. Outstanding Florida Waters as defined in Chapter 17-3.302, Florida Administrative Code; and Aquatic Preserves as created and provided for in Chapter 258, Florida Statutes.
6. Water bodies within a District permitted public water supply wellfield cone-of-depression which are not separated from the aquifer by strata at least ten feet thick and having an average saturated hydraulic conductivity of less than 0.1 foot per day; where the cone-of-depression is defined by one of the following:
 - a. in those areas of the District where no local wellfield protection ordinance has been adopted by the local governing body, the one foot drawdown line as expressed in the water table aquifer under conditions of no rainfall and 100 days of pumpage at the permitted average daily pumpage rate (where significant canal recharge is indicated, canal recharge representative of a 1 in 100 year drought will be considered);
 - b. Broward County Wellfield Protection Ordinance contour for Zone 3 (Broward County Wellfield Protection Ordinance 84-60, as incorporated into Broward County Code Chapter 27, Article XIII, enacted in August 1984). This information is hereby published by reference and incorporated into this rule.

- c. Dade County Wellfield Protection Ordinance contour showing maximum limits (Section 24-12.1 Protection of Public Potable Water Supply Wells; Chapter 24 Environmental Protection; Code of Metropolitan Dade County, Florida). This information is hereby published by reference and incorporated into this rule.
- (c) Water surface and roofed areas can be deducted from site areas only for water quality pervious/impervious calculations. The water surface area meeting dimensional criteria may also be subtracted from the total site area when making final water quality treatment volume calculations.
- (d) In cases of widening existing urban public highway projects, the District shall reduce the water quality requirements, if the applicant provides documentation which demonstrates that all reasonable design alternatives have been considered, and which provides evidence that the alternatives are all cost-prohibitive.
- (e) Projects located within cones of depression - Retention/detention area locations shall not reduce hydraulic recharge distances to public water supply wells in excess of 2 percent, nor shall wet retention/detention areas be closer to public water supply wells than 300 feet.

5.3 Incorporation of Natural Areas and Existing Water Bodies -

5.3.1 *Natural Water Bodies and Existing Water Bodies*

Natural areas and existing water bodies may be used for retention/detention purposes when not in conflict with environmental (see subsection 4.2.2.4), water quality, (see Sections 4.2.4 - 4.2.4.5 herein) or public use considerations. Candidate areas for such purposes include:

- (a) Previously degraded areas,
- (b) Man made areas such as borrow pits, for example,
- (c) Extensive areas which have the ability to absorb impacts easily,
- (d) Areas incorporated into a system with mitigation features.

5.4 Underground Exfiltration Systems -

- (a) Systems shall be designed for the retention volumes specified in Section 5.2.1 for retention systems, exfiltrated over one hour for retention purposes, prior to overflow, and based on test data for the site. (Note: such systems will not be acceptable on projects to be operated by entities other than single owners or entities with full time maintenance staff.)
- (b) A safety factor of two or more shall be applied to the design to allow for geological uncertainties.

- (c) A dry system is one with the pipe invert at or above the average wet season water table.

5.5 Sewage Treatment Percolation Ponds -

Above ground percolation pond dikes shall not be within 200 feet of water management lakes or 100 feet of dry retention/detention areas. Additional information and calculations (such as volume and rate of application to the pond(s) or flow net analyses) by the applicant will be necessary in unusual cases requiring deviations from these dimensions.

5.6 Criteria for Creation of Water Bodies -

The creation of water bodies shall meet both of the following criteria:

- (a) Entrapped salt water, resulting from inland migration of salt water or penetration of the freshwater/salt water interface, will not adversely impact existing legal water users.
- (b) Excavation of the water body shall not penetrate a water-bearing formation exhibiting poorer water quality for example., in terms of chloride concentrations.

5.7 Impervious Areas -

Runoff shall be discharged from impervious surfaces through retention areas, detention devices, filtering and cleansing devices, or subjected to some other type of Best Management Practice (BMP) prior to discharge from the project site. For projects which include substantial paved areas, such as shopping centers, large highway intersections with frequent stopped traffic, and high density developments, provisions shall be made for the removal of oil, grease and sediment from storm water discharges.

5.8 Stagnant Water Conditions -

Configurations which create stagnant water conditions such as hydraulically dead end canals are to be avoided, regardless of the type of development.

5.9 Water Quality Monitoring -

All new drainage projects will be evaluated based on the ability of the system to prevent degradation of receiving waters and the ability to conform to State water quality standards (see Chapters 62-3, 62-4 and 62-302, F.A.C.).

- 5.9.1 (a)** There are areas within the District where water quality considerations are extremely important, because of the sensitivity of the area. These areas include:
 - 1. Lake Okeechobee and the Kissimmee River.
 - 2. Water bodies designated as Class I or Class II waters by the Florida Department of Environmental Protection.

3. Canals back-pumped to Lake Okeechobee or to the Conservation areas, or proposed for back-pumping.
 4. Sensitive areas, such as the Savannas in St. Lucie and Martin Counties, the Six Mile Cypress Strand and Estero Bay Aquatic Preserve in Lee County and the Big Cypress area of Collier County.
 5. Outstanding Florida Waters as defined in Chapter 17-3.302, Florida Administrative Code.
- (b) New developments which plan to utilize sensitive areas for disposal of stormwater will be given more detailed evaluation by the District Staff. In addition, new projects entailing a more intensified land use, such as industrial parks, and planning to discharge to a sensitive receiving water, directly or indirectly, shall be required to institute a water quality monitoring program if the applicant is unable to provide adequate assurances (by such means as routing drainage of areas where polluting materials would be located away from the surface water management system; developing restrictive covenants, or similar documents, which would have the effect of prohibiting polluting materials on the project site; or proposing other methods of assurance) that degradation of the receiving body water quality will not occur. The following listing of land use intensity is in ascending order.
1. Wetlands (including transition zones adjacent thereto)
 2. Forested lands
 3. Rangeland
 4. Agricultural
 5. Urban and built-up land
- 5.9.2** Monitoring will normally be required for sites with high pollutant generating potential, such as industrial sites, and Class I and II solid waste disposal sites.
- 5.9.3** There are two reasons for requiring water quality monitoring by permittees, as follows:
- (a) Such data can be used to determine if the pollution abatement practices incorporated into the design for the drainage system are functioning properly.
 - (b) In some cases there may be a real and immediate concern regarding degradation of quality in the receiving waters, regardless of the apparent pollutant removal efficiency of the drainage system.
- 5.9.4** The reason for the monitoring requirement will be stated in the Staff Report for each Permit. Also included in the permit will be the monitoring and reporting schedules and the parameters of interest. Each monitoring program will be designed specifically for the land

use or individual project in question and will include applicable surface and ground water sampling. Staff shall specify applicable project specific parameters such as those listed in Chapter 17-3.302, F.A.C. The applicant shall use a Florida Department of Environmental Protection- or Florida Department of Health and Rehabilitative Services- certified laboratory for all water quality sampling and analysis. The District recommends that the applicant submit final results from the laboratory on a DOS-formatted 3.5" computer disk which will be supplied by the District. The disk will contain a program requiring the input of all pertinent data associated with the water quality monitoring special condition(s). If the permittee or their contracted laboratory does not have MS-DOS computer capabilities, water quality analysis may be submitted on paper. Examples of records to be supplied are as follows: sample date, sample location with D for discharge or N for no discharge, water discharge rates (cfs) and concentration values of indicated elements or compounds.

5.9.5 As a general rule, monitoring required of permittees will be confined to points within their boundaries. If additional sampling is needed in order to assess off-site impacts of the projects, the responsible party (the permittee or District) will be named in the permit. The determination of the responsible party will be based upon the accessibility of the monitoring site to the permittee.

5.9.6 Applicants are advised that Staff Reports written and Permits issued for projects not requiring monitoring at this time will normally include a statement to the effect that water quality monitoring may be required in the future. This should not be construed as an indication that the District is contemplating the implementation of a program of intensive water quality monitoring by all permittees. If water quality problems develop in specific areas, however, permittees will be put on notice in this manner that they may have to determine the quality of the water which they are discharging.

5.10 Solid Waste Facilities -

(a) Surface water management systems for Class I and II solid waste facilities, as defined by Chapter 17-701, F.A.C., shall be so designed, constructed, and operated as to maintain the integrity of the landfill at all times (during construction, operation, closure and post closure). Applicant must provide assurances that:

1. all flows will be conveyed at non-erosive velocities,
2. the project is designed to minimize erosion.

(b) Design features in support of this requirement include features such as:

1. slopes adequate to promote runoff but not affect slope stability,
2. intermediate benches or swales which reduce runoff velocities and limit erosion,
3. vegetation of closed portion of landfill.

- (c) Class I and II landfill projects shall provide adequate assurance that leachate will not enter the surface water management system. This assurance may be provided through affirmative demonstration that the requirement of Chapter 17-701, F.A.C. for design and emplacement of liners, leachate collection systems, and treatment and disposal of leachate will be met.
- (d) Borrow pits shall not be included in the surface water management system unless the applicant can affirmatively demonstrate that leachate will not enter the borrow pit, and that the provisions of Rule 17-3.302 and Chapter 17-4, F.A.C. will be met.
- (e) Dewatering operations at active, unlined landfills will not be permitted.
- (f) For Class I and II landfills the District shall require additional Best Management Practices, such as:
 - 1. Detention in excess of the quantities stated in Section 5.2.
 - 2. Dry detention areas.
 - 3. Dry conveyance swales with adequate dimensions to permit maintenance.
 - 4. Filter mechanisms for additional water quality enhancement prior to discharge.
 - 5. Skimmers in front of discharge structures to restrict discharge of floatable materials.
 - 6. Screw gates on water control structures capable of restricting discharge of poor quality surface water.
 - 7. Vegetation of appropriate portions of the water management system, such as conveyance swales.
- (g) To provide information for assessing the need for Best Management Practices at a specific site, District staff will require a hydrogeologic investigation that shall, at a minimum, provide information on:
 - 1. the hydrogeologic properties of the formations underlying the landfill, including aquifer and characteristics, groundwater elevations and direction and rate of groundwater flow,
 - 2. location of existing wells within one-half mile of the site perimeter,
 - 3. locations and specifications of existing or proposed monitor wells,
 - 4. the location and chemical composition of any known leachate plumes.

- (h) Applicants should consult with District staff prior to or at pre-application Technical Advisory Committee meetings to determine the specific requirements which will apply for a particular project.

6.0 WATER QUANTITY CRITERIA

6.1 General -

This document refers, in common engineering language, to flood and drought frequency impacts interchangeably with rainfall frequency. The Applicant is cautioned however that water resource impacts are of interest in the permit process, and that additional calculations may be required to identify other combinations of site conditions and rainfall frequencies which might result in impacts of the specified frequency. Examples include designs affected by spring tides, fluctuating tides and fluctuating receiving water stages.

6.2 Discharge Rate -

Off-site discharge rate is limited to rates not causing adverse impacts to existing off-site properties, and:

- (a) historic discharge rates, or
- (b) rates determined in previous District permit actions, or
- (c) rates specified in District criteria (see Appendix 2).

6.3 Design Storm -

Unless otherwise specified by previous District permits or District criteria, a storm event of 3 day duration and 25 year return frequency shall be used in computing off-site discharge rates. Applicants are advised that local drainage districts or local governments may require more stringent design storm criteria. An applicant who feels its project is subject to unusual site specific conditions may, as a part of the permit application process, request an alternate discharge rate.

6.4 Flood Protection of Building Floors -

Building floors shall be at or above the 100 year flood elevations, as determined from the most appropriate information, including Federal Flood Insurance Rate Maps. Both tidal flooding and the 100 year, 3 day storm event shall be considered in determining elevations.

Lower floor elevations will be considered for agricultural buildings which are non-residential and are not routinely accessed by the public. For example, agricultural structures such as barns or equipment sheds would normally qualify for a lower finished floor elevation. Applicants are cautioned that potential water quality impacts caused by flooding of contents housed in a structure will be considered in allowing a reduced finished floor elevation.

6.5 Flood Protection of Roads and Parking Lots -

Many local governments have criteria for the protection of roads and parking lots from flooding.

- (a) In cases where criteria are not specified by the local government with jurisdiction, the following design criteria for drainage and flood protection shall be used:

frequency - 5 years
duration - 1 day (road centerlines)
1 hour (parking lots served by exfiltration systems)

- (b) If the local government with jurisdiction has set flood protection criteria for roads and parking lots within commercial projects, the District will not require the applicant to meet District road and parking lot flood protection criteria. This shall only be allowed for commercial projects which are to remain single owner projects. Such criteria may provide lesser degrees of flood protection than required under District criteria. Projects which are not permitted pursuant to District criteria will be special conditioned, as notice to the Permittee and local government, that a substandard design has been permitted. The applicant shall, however, meet District criteria for water quality, off-site discharge and building floor elevations.

- (c) In each basin, the minimum roadway crown elevation shall be at least 2 feet higher than the control elevation, in order to protect the road subgrade.

6.6 Flood Plain Encroachment -

No net encroachment into the floodplain, between the average wet season water table and that encompassed by the 100 year event, which will adversely affect the existing rights of others, will be allowed.

6.7 Historic Basin Storage -

Provision must be made to replace or otherwise mitigate the loss of historic basin storage provided by the project site.

6.8 Offsite Lands -

Onsite works such as swales and dikes shall be used to allow the passage of drainage from offsite areas to downstream areas. Diking of project development areas or other equivalent methods shall be used to contain water at or above stages identified in the project discharge computations.

6.9 Minimum Drainage -

- (a) Residential projects shall have systems with the calculated ability to discharge by surface flow or subsurface percolation at least 3/8 inch per day during or subsequent to the storm of the allowable discharge frequency and duration, so that lowering of the water surface elevations within the water management system to the maximum depth compatible with the environmental protection or other

constraints as described in 6.10, will occur in 12 days or less.

- (b)
 - 1. Commercial and industrial projects to be subdivided for sale, where the initial permittee will not build the entire system, are required to have installed by the initial permittee, as a minimum,
 - a. the required water quality system for one inch of runoff detention or one half inch of runoff retention in the master system for the total developed site. The individual sites must provide the remainder (2.5" x % impervious - one inch) which may be in exfiltration trench. The master system must be in a legally defined common area. The master system cannot utilize exfiltration trench.
 - b. a stormwater collection and conveyance system to interconnect the retention/detention system with the outfall, with access points to the system available to each individual lot or tract. The system shall be sized to limit discharge under design conditions to the allowable discharge.
 - 2. Projects permitted in such manner will require deed restrictions which identify to lot or tract purchasers:
 - a. the amount of additional on-site storm water management system necessary to provide flood protection for specific design events,
 - b. any additional retention/detention required for water quality purposes, and
 - c. the assumed per cent impervious, or impervious area used in design calculations.

6.10 Overdrainage and Water Conservation -

Systems shall be designed to:

- (a) Maintain existing water table elevations in existing wellfield cones of depression, and
- (b) Preserve site environmental values (see Section 4.0), and
- (c) Not waste freshwater, and
- (d) Not lower water tables which would adversely affect the existing rights of others, and
- (e) Preserve site ground water recharge characteristics.

6.11 Detention and Control Elevations -

Detention and control elevations shall be set to accomplish 6.10 and are subject to the following criteria:

- (a) Wetland protection elevations,
- (b) Consistency with surrounding land and project control elevations and water tables,
- (c) Possible restrictions by other agencies to include tree protection and landscape ordinances,
- (d) Consistency with water use permits, and
- (e) A maximum depth of six feet below natural ground.

6.12 Lake-Wetland Separation -

Lakes which potentially may adversely affect wetland areas shall be separated from the wetland preservation, creation, or restoration areas by a minimum distance as determined by the following criteria:

- (a) A separation distance (shortest distance between the wetland jurisdictional line and the edge of water in the proposed water body at the proposed control elevation) producing a gradient less than or equal to 0.005 using the difference in the elevation of the jurisdictional boundary of the wetland and the basin control elevation to calculate the driving head. Staff will consider elevations differing from the jurisdictional boundary of the wetland to calculate the driving head. The applicant will be required to submit monitoring data or other relevant hydrologic data from the site to substantiate the reason for using a different starting elevation. Existing conditions alone will not be considered sufficient reason to use a different elevation if there is evidence that activities on or adjacent to the project site may be responsible for lowering water tables which may be currently having an adverse impact on the subject wetlands. In these cases, preservation of the wetlands cannot be assured by simply maintaining the existing conditions.
- (b) If the gradient resulting from any separation distance and the driving head as defined above is between 0.005 and 0.015, then calculations will be required which demonstrate that the drawdown in the adjacent wetland(s) will be of a magnitude which will not result in adverse impacts on the wetland. A drawdown of more than 12 vertical inches in a 90-day period with no recharge shall be presumed to be an adverse impact.
- (c) If the gradient is equal to or greater than 0.015, then construction of an impermeable barrier or other equivalent action must be taken to mitigate for the impact of the proposed excavation between the wetland and the excavation.
- (d) The District will review modelling results which demonstrate that a gradient equal

to or greater than 0.015 will not have an adverse impact on the adjacent wetland. A detailed soil profile constructed from a minimum of three separate sampling locations with permeability testing results on selected samples. Two-dimensional modelling may be necessary to represent the site geometry.

6.13 Water Supply Sources -

An evaluation of the impact of the proposed surface water management system on sources of water supply must be submitted with the surface water management application. Cumulative impacts which may result from the construction and operation of the proposed surface water management system must be evaluated in conjunction with the cumulative withdrawals of existing legal uses of water.

7.0 WATER MANAGEMENT SYSTEM DESIGN AND CONSTRUCTION CRITERIA

7.1 Discharge Structures -

- (a) All design discharges shall be made through structural discharge facilities. Earth berms shall be used only to disperse or collect sheet flows from or to ditches, swales, etc., served by discharge structures.
- (b) Discharge structures shall be fixed so that discharge cannot be made below the control elevation, except that emergency devices may be installed with secure locking devices. Use of emergency devices must be coordinated with District personnel prior to opening or as soon as possible thereafter. The District's Executive Director is authorized to specify the use of emergency devices pursuant to rule 40E-1.611, F.A.C.
- (c) Discharge structures must be non-operable unless approved otherwise.
- (d) The District recommends that discharge structures include gratings for safety and maintenance purposes. The use of trash collection screens is desirable.
- (e) Discharge structures shall include a baffle system to encourage discharge from the center of the water column rather than the top or bottom. Discharge structures from areas with greater than 50 percent impervious area or from systems with inlets in paved areas shall include a baffle, skimmer, or other mechanism suitable for preventing oil and grease from discharging to or from retention/detention areas.
- (f) Direct discharges, such as through culverts, stormdrain, and weir structures, will be allowed to receiving waters which by virtue of their large capacity, or configuration are easily able to absorb concentrated discharges. Such receiving waters include existing storm sewer systems and man-made ditches, canals and lakes.
- (g) Indirect discharges, such as overflow and spreader swales, are required where the receiving water or its adjacent supporting ecosystem might be degraded by a direct discharge. The discharge structure would therefore discharge, for example, into the overflow or spreader swale, which in turn would release the water to the actual receiving water. Such receiving waters include, for example, natural streams, lakes, wetlands and land naturally receiving overland sheetflow. Spreader swales shall be of a length sufficient to reduce discharge velocities to the receiving waters to historic rates or rates less than two feet per second.
- (h) Pumped systems will only be allowed for single owner or governmental agency operation entities, unless perpetual operation ability can be assured.

7.2 Control Devices/Bleed-down Mechanisms for Detention Systems-

- (a) District criteria require that gravity control devices shall be sized based upon a maximum design discharge of one half inch of the detention volume in 24 hours.

The devices shall incorporate dimensions no smaller than 6 square inches of cross sectional area, two inches minimum dimension, and 20 degrees for "V" notches. Systems which are limited by a discharge structure with an orifice no larger than the minimum dimensions described herein shall be presumed to meet the discharge quantity criteria except for projects which are required to have zero discharge. Applicants are advised that local drainage districts or local governments may have more stringent gravity control device criteria.

- (b) Gravity control devices shall be of a "V" or circular shaped configuration, whenever possible, to increase detention time during minor events.
- (c) Pumped control devices, if pump discharge is permitted, shall be sized based on a design discharge of 20 percent of the detention volume in one day.

7.3 Dry Retention/Detention Areas (Not Applicable to Natural or Mitigation Wetland Areas) -

- (a) Dry retention/detention areas shall have mechanisms for returning the groundwater level in the area to the control elevation. The bleed-down rate for these systems is the same as in section 7.2.A., herein.
- (b) Mosquito control ditches or other appropriate features for such purpose, shall be incorporated into the design of dry retention/detention areas.
- (c) The design of dry retention/detention areas shall incorporate considerations for regular maintenance and vegetation harvesting procedures.

7.4 Wet Retention/Detention Area Dimensional Criteria (As Measured at or from the Control Elevation) -

- (a) Area - 0.5 acre minimum
- (b) Width - 100 feet minimum for linear areas in excess of 200 feet length. Irregular shaped areas may have narrower reaches but shall average at least 100 feet.
- (c) Depth - Shallow, littoral areas are desirable for water quality enhancement purposes. Such areas are defined for purposes of this criteria as the portion of wet retention/detention bodies shallower than 6 feet as measured from below the control elevation. The minimum shallow, littoral area shall be the lesser of 20 percent of the wet retention/detention area or 2.5 percent of the total of the retention/detention area (including side slopes) plus the basin contributing area. It is recommended that 25 to 50 percent of the wet retention/detention area be deeper than 12 feet.
- (d) Side slopes - for purposes of public safety, water quality enhancement and maintenance, all wet retention/detention areas shall have side slopes no steeper than 4:1 (horizontal:vertical) out to a depth of two feet below the control elevation, or an equivalent substitute. Sideslopes shall be topsoiled, nurtured or planted from

2 feet below to 1 foot above control elevation to promote vegetative growth. Littoral zone vegetation growth survival shall be a consideration of operation permit issuance.

- (e) Bulkheads - Bulkheads shall be allowed for no more than 40 percent of the shoreline length, but compensating littoral zone must be provided based on appropriate maximum allowable side slope including local government requirements.

7.5 Maintenance Access and Easements -

Minimum perimeter maintenance and operation easements of 20 feet width at slopes no steeper than 4:1 (horizontal:vertical) shall be provided beyond the control elevation water line. These easements shall be legally reserved to the operation entity and for that purpose by dedication on the plat, deed restrictions, easements, or other equivalent documents, so that subsequent owners or others may not remove such areas from their intended use. Water management areas, including 20 foot wide maintenance easements at a minimum, shall be connected to a public road or other location from which operation and maintenance access is legally and physically available.

7.6 Exfiltration Systems -

Exfiltration systems must conform with the following:

- (a) Pipe diameter - 12" minimum
- (b) Trench width - 3' minimum
- (c) Rock in trench must be enclosed in filter material, at least on the top and sides.
- (d) Maintenance sumps in inlets.

8.0 REQUIRED DESIGN INFORMATION AND ASSUMPTIONS

8.1 Antecedent Conditions -

Antecedent conditions shall be average wet season elevations for water table or other water surfaces.

8.2 Rainfall -

Distributions and intensities consistent with one or more of these Reference Sources:

- (a) SFWMD Technical Memorandum, Frequency Analysis of One and Three Day Rainfall Maxima for central and southern Florida, Paul Trimble, October 1990 and the following distribution table:

Time (hours)	Cumulative Percentage of Peak One Day Rainfall
0	0
24	14.6
48	35.9
58	57.2
59	62.8
59.5	67.8
59.75	82.8
60	101.5
60.5	108.8
61	112.6
62	117.7
72	135.9

100% One Day
Rainfall

- (b) Actual gage data analyzed by accepted statistical methods,
- (c) U.S. Department of Agriculture, Soil Conservation Service, "Rainfall Frequency Atlas of Alabama, Florida, Georgia and South Carolina for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 years" (1973).
- (d) Florida Department of Transportation "Drainage Manual" (Second Edition, revised 1978) Revised Rainfall Intensity Curves per Directive No. 0736-01-79.

8.3 Evapotranspiration -

Amounts can be estimated as follows:

- (a) Groundwater depth 0 to 1' - 0.3" ET/day
- (b) Groundwater depth 1' to 2.5' - 0.2" ET/day
- (c) Groundwater depth 2.5' to 4' - 0.1" ET/day
- (d) Groundwater depth below 4' - 0" ET/day

8.4 Storage -

8.4.1 Open Surface

If open surface storage is to be considered in the review, the Applicant shall submit stage-storage computations. If open surface storage plus discharge is to be considered, the stage-discharge computations shall also be submitted. Actual rather than allowable discharges shall be used in routing. For the more extreme events, such as 100 year frequency, discharge should be ignored because the high tail water stage in the receiving water effectively prevents any but a negligible discharge. In such cases a mass accounting of on-site water will suffice, if the applicant can demonstrate that no adverse impacts will occur to adjacent areas.

8.4.2 Ground

The Soil Conservation Service has made the following estimate of soil storage capability for the normal sandy soils found within the District in their average natural state:

Depth to Water Table	Cumulative Water Storage
1'	0.6"
2'	2.5"
3'	6.6"
4'	10.9"

- (a) For the same sandy soils which have been compacted intentionally or incidental to earthwork operations, the cumulative storage shall be reduced 25 percent. An applicant may submit site-specific soil storage capability data.
- (b) Groundwater storage beneath impervious surfaces generally appears impractical to any great degree because of the trapped air which water cannot displace. It further appears impractical below four feet depths, except in high sandy coastal ridge areas, because of the relationship between infiltration rates and runoff rates in most parts of south Florida.

8.5 Infiltration and Percolation -

8.5.1 Ground Surface

Ground surface infiltration will be reviewed on the basis of commonly accepted procedures such as those of Soil Conservation Service (see U.S. Department of Agriculture, Soil Conservation Service Technical Paper No. 149, "A Method for Estimating Volume and Rate of Runoff in Small Watersheds" (1973), and U.S. Department of Agriculture, Soil Conservation Service Technical Release No. 55, "Urban Hydrology for Small Watersheds" (1975); or Rational Method (see Florida State Department of Transportation, "Drainage Manual" (2nd Edition, rev. 1978)); or standard Civil Engineering textbooks), unless test data are submitted to justify other procedures.

8.5.2 Subsurface

Subsurface exfiltration will be reviewed only on the basis of representative or actual test data submitted by the Applicant. Test parameters such as elevation, location, and soils, shall be consistent with those of the designed system. The Dade County Department of Environmental Resource Management and Florida Department of Transportation are suggested as reference sources to Applicants for test procedures and design and maintenance performance of subsurface exfiltration systems.

8.6 Runoff -

The usual methods of computation are as follows:

- (a) Rainfall minus losses and storage.
- (b) Soil Conservation Service (see U.S. Department of Agriculture, Soil Conservation Service, "National Engineering Handbook, Section 4, Hydrology" -1972), with extra attention to hydrologic accounting of water table conditions. Peak factors used for natural systems shall not exceed "257" unless project specific site conditions warrant use of a larger peak factor.
- (c) Rational method, for water quality retention/detention purposes.

8.7 Receiving Water Stage -

8.7.1 Regulated Systems

Applicants are advised that design and maintained stage elevations are available either from the respective local jurisdiction or the District. Stages for the District's system for frequencies other than the design will be estimated by the District upon request from the Applicant.

8.7.2 Non-regulated Systems

It is recommended that the Applicant compute receiving water stages for such systems from the best available data and submit the results to the District for review and concurrence before utilizing such results in further computations.

8.7.3 Any System

Variable tailwater stages shall be considered if they have a significant influence on the design.

8.8 Discharge -

8.8.1 Allowable Discharges

For the purpose of meeting maximum allowable discharges, peak discharges shall be computed as the maximum average discharge over a time period equal to the time of concentration of the contributory area, unless project specific conditions warrant an alternate methodology.

8.8.2 Non-urban Gravity Systems

Rural gravity systems which are to be connected to District facilities are reviewed on the basis of the discharge culvert operating at a fixed head loss to meet the allowable discharge rate. This basis is justified by the estimate that the upstream headwater generated by rural runoff will be unable to collect at the upstream culvert end appreciably faster than the rate at which the receiving water rises. The fixed head loss amounts are 0.5' except in south Dade County (south of Canal C-2) where the value is 0.2'.

9.0 OPERATING ENTITY REQUIREMENTS

9.1 General Requirements -

- (a) The District considers the following entities acceptable to satisfy permit limiting condition 40E-4.381(1)(h):
1. Local governmental units including counties or municipalities, or Municipal Service Taxing Units.
 2. Active Chapter 298 Florida Statutes water control districts or drainage districts, or Chapter 190 Florida Statutes Community Development Districts or Chapter 170 Florida Statutes Special Assessment Districts.
 3. Non-profit corporations including homeowners associations, property owners associations, condominium owners associations or master associations.
 4. The property owner or developer as Permittee is normally not acceptable as a responsible entity if the property is to be sold to various third parties. However, the property owner or developer will be acceptable under one of the following circumstances:
 - a. The property is wholly owned by said Permittee and is intended to be so retained. This would apply to a farm, corporate office or single industrial facility for example.
 - b. The ownership of the property is retained by the Permittee and is either leased or rented to third parties such as in the case of most shopping centers, apartments or mobile home park lots.
- (b) To satisfy permit limiting condition 40E-4.381(1)(h), F.A.C., the Permittee must supply appropriate written proof, such as either by letter or resolution from the governmental entity that the governmental entity will accept the operation and maintenance of all the surface water management system components; or draft corporation/association documents prior to staff report approval. For Class I and II solid waste sites the entity will be responsible for perpetual maintenance of the surface water management system after closure of the facility.

9.2 Association Requirements -

- 9.2.1** If a Homeowners or Property Owners Association or Master Association is proposed, the Permittee must submit the draft Articles of Incorporation and the Declaration of Protective Covenants or Deed Restrictions, as well as a reference map if referred to in the documents, for review and staff approval of the provisions meeting the requirements of this section. The Permittee must submit a recorded copy of the Deed Restrictions and associated exhibits, a filed copy of the Articles of Incorporation and a copy of the Certificate of Incorporation prior to or simultaneous with the submittal of the Construction Completion/Construction Certification statement.

- 9.2.2** (a) If a Condominium Association is proposed, the Permittee must submit the draft Articles of Incorporation and the Declaration of Condominium, as well as a reference map if referred to in the documents, for review and staff approval of the provisions meeting the requirements of this section. The Permittee must submit a recorded copy of the Declaration of Condominium and associated exhibits, a filed copy of the Articles of Incorporation and a copy of the Certificate of Incorporation prior to or simultaneous with the submittal of the Construction Completion/Construction Certification statement.
- (b) Compliance with the requirements of this section does not relieve the Permittee of its duty to comply with the applicable provisions of Florida laws, specifically Chapters 617 or 718, Florida Statutes.

9.2.3 The Association must have the following general powers and attributes, which shall be reflected in the Articles of Incorporation or other documents of record:

- (a) Own and convey property.
- (b) Operate and maintain common property, specifically the surface water management system as permitted by the South Florida Water Management District including all lakes, retention areas, culverts and related appurtenances.
- (c) Establish rules and regulations.
- (d) Assess members and enforce said assessments.
- (e) Sue and be sued.
- (f) Contract for services (if the Association contemplates employing a maintenance company) to provide the services for operation and maintenance.
- (g) The Association must have as members all the homeowners, lot owners, property owners or unit owners.
- (h) The Association shall exist in perpetuity; however, if the Association is dissolved, the Articles of Incorporation must provide that the property consisting of the surface water management system shall be conveyed to an appropriate agency of local government. If it is not accepted, then the surface water management system must be dedicated to a similar non-profit corporation.

9.2.4 The Association must have the following covenants and restrictions, which shall be set forth in the Declaration of Protective Covenants, Deed Restrictions, Declaration of Condominium, or other recorded document which sets forth the Association's rules and regulations:

- (a) That it is the responsibility of the Association to operate and maintain the surface water management system.

- (b) The surface water management system is owned by the Association or described therein as common property.
- (c) That there be a method of assessing and collecting the assessment for operation and maintenance of the surface water management system.
- (d) That any proposed amendment to the association's documents, which would affect the surface water management system (including environmental conservation areas and the water management portions of the common areas) must be submitted to the District for a determination of whether the amendment necessitates a modification of the surface water management permit. If a modification is necessary, the District will so advise the permittee.
- (e) That the rules and regulations be in effect for at least 25 years with automatic renewal periods thereafter.
- (f) If wetland mitigation monitoring will be required and the operational entity will be responsible to carry out this obligation, the rules and regulations shall state that it will be the association's responsibility to complete the task successfully, including meeting including all conditions associated with mitigation maintenance and monitoring.
- (g) The surface water management permit and its conditions shall be attached to the rules and regulations as an exhibit. The Registered Agent for the Association shall maintain copies of all further permitting actions for the benefit of the association.

9.2.5 Deviation from, or modification to, the association requirements can only be based upon:

- (a) Intervening local government requirements of a more stringent nature such as the requirement of a maintenance agreement and posting of bond by the developer.
- (b) The uniqueness of the project requiring an alternative entity. Such alternative entity must be evaluated upon an individual basis with any and all necessary agreements or easements in effect before approval will be given.

9.2.6 Phased projects shall be subject to the following additional requirements:

- (a) If a master property owner's association is proposed for a project which will be constructed in phases, and subsequent phases will utilize the surface water management system for the initial phase or phases, the association must be created with the ability to accept future phases into the association.
- (b) If the development scheme contemplates independent associations for different phases, but proposes an interdependent water management system for the different phases, one of the following alternatives must be chosen by the applicant for setting up the operating entities:

1. A master association must be formed which includes all of the various associations within the project, with the master association having the responsibility and legal ability to operate and maintain the surface water management system for the entire project.
 2. If no master association is proposed, each entity which will operate and maintain a portion of an integrated surface water management system must have cross easements for drainage, ingress and egress capabilities, and the ability to enter and maintain the various portions, should any sub association fail to operate and maintain the portion of the surface water management system within their boundaries. A definition of operation and maintenance responsibilities between the entities shall be included in any such document.
- (c) If the master association delegates primary responsibility for operating the portion of the surface water management system to a sub association, all association documents shall clearly define that the master association has ultimate authority and responsibility to enter, maintain and operate the surface water management system should any sub association fail to do so.
- (d) If the project contains a golf course, the owner/operator must be a member of the association. Association documents must reflect this relationship.

10.0 SURFACE WATER MANAGEMENT SYSTEM CERTIFICATION AND OPERATION**10.1 Construction Completion/Construction Certification -**

- (a) Within 30 days of the completion of the surface water management system construction, a Florida registered professional engineer shall certify that the construction was completed and that the system was constructed in substantial conformance with the plans and specifications approved by the District. The above requirement shall be met by submittal of a completed and executed Construction Completion/Construction Certification Form #0881, or equivalent.
- (b) The District recognizes that Form #0881 does not apply to all water management systems. If Form #0881 does not apply to a particular system, for example, exfiltration trench, then a certification confirming the appropriate elements and dimensions of that system, such as lengths, diameters and elevations of the exfiltration system must be provided. The following certification statement must also appear on the certification report. Note that if no deviations are detected by the certifying engineer, then the District is not requiring that a copy of the approved permit drawings be submitted.

I HEREBY NOTIFY THE DISTRICT OF THE COMPLETION OF CONSTRUCTION OF ALL THE COMPONENTS OF THE SURFACE WATER MANAGEMENT FACILITIES FOR THE ABOVE REFERENCED PROJECT AND CERTIFY THAT THEY HAVE BEEN CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE PLANS AND SPECIFICATIONS PERMITTED BY THE DISTRICT. [A COPY OF THE APPROVED PERMIT DRAWINGS IS ATTACHED WITH DEVIATIONS NOTED, IF APPLICABLE.] I HEREBY AFFIX MY SEAL THIS DAY OF _____, 19____. (REFERENCE 373.117, 373.419, F.S).

Engineer's Signature and Seal

Date

Name (Please Print)

FL Registration No.

10.2 Construction Completion/Construction Certification for Phased Projects -

In addition to the above, certification of phases within a project will be acceptable if:

- (a) The backbone drainage facilities have been constructed and certified; or
- (b) The engineer has provided documentary evidence that the certified phase can function satisfactorily and permanently independent of the backbone system.

10.3 Operation Phase Becoming Effective -

The operation phase of a project shall not become effective until the construction or provision of the required mitigation/compensation is complete.

APPENDICES

- Appendix 2 Allowable Discharges for South Florida Water Management District Canals
- Appendix 3 Urban Retention/Detention
- Appendix 6 Above Ground Impoundments

NOTE: Appendices 2, 3, and 6, above, were previously adopted and incorporated into the document entitled "Basis of Review for Surface Water Management Permit Applications Within the South Florida Water Management District - March, 1994". Appendices 1, 4, 5, 7 and 8 of that document have been repealed.

APPENDIX 2

**ALLOWABLE DISCHARGE FORMULAS
FOR
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
CANALS**

(MAXIMUM AMOUNTS BASED ON PRIMARY SYSTEM CAPACITY FOR
NEW PROJECTS; SECONDARY AND OTHER INTERMEDIATE SYSTEM
CAPACITIES MAY BE MORE LIMITING.)

SFWMD - ALLOWABLE DISCHARGE FORMULAS

<u>Canal</u>	<u>Allowable Runoff</u>	<u>Design Frequency</u>
C-1	$Q = \left(\frac{112}{\sqrt{A}} + 31 \right) A$	10 year
C-2	Essentially unlimited inflow by gravity connections southeast of Sunset Drive:	200 year +
	54 CSM northwest of Sunset Drive	
C-4	Essentially unlimited inflow by gravity connections east of S.W. 87th Avenue	200 year +
C-6	Essentially unlimited inflow by gravity connections east of FEC Railroad	200 year +
C-7	Essentially unlimited inflow by gravity connection	100 year +
C-8	Essentially unlimited inflow by gravity connection	200 year +
C-9	Essentially unlimited inflow by gravity connection east of Red Road; 20 CSM pumped, unlimited gravity with development limitations west of Red Road or Flamingo Blvd.	100 year +
C-10	-----	200 year +
C-11	20 CSM west of 13A; 40 CSM east of 13A	-----
C-12	90.6 CSM	25 year
C-13	75.9 CSM	25 year
C-14	69.2 CSM	25 year
C-15	70.0 CSM	25 year
C-16	62.6 CSM	25 year
C-17	62.7 CSM	25 year
C-18	41.6 CSM	25 year
C-19	57.8 CSM	
C-23	31.5 CSM	10 year
C-24	30.25 CSM	10 year
C-25	$Q = \left(\frac{47}{\sqrt{A}} + 28 \right) A$ (Under review)	10 year
C-38	31.1 CSM (Subject to restrictions of Basin Rule)	10 year
C-40, 41, 41A	35.4 CSM	10 year
Hillsboro Canal (east of S-39)	35 CSM	25 year
North New River (East of S-34)	70.8 CSM	25 year
Everglades Ag. Area (all canals)	20 CSM	5 year
L-28	11.8 CSM	-----
C-51	35 CSM east of Turnpike; 27 CSM west of Turnpike (Subject to restrictions of Basin Rule)	10 year
C-100, 100A, 100B, 100C, 100D:	$Q = \left(\frac{104}{\sqrt{A}} + 43 \right) A$	10 year
C-102	$Q = \left(\frac{119}{\sqrt{A}} + 25 \right) A$	10 year
C-103N, C-103S	$Q = \left(\frac{107}{\sqrt{A}} + 39 \right) A$	10 year
C-110	$Q = \left(\frac{137}{\sqrt{A}} + 9 \right) A$	10 year
C-111	$Q = \left(\frac{117}{\sqrt{A}} + 29 \right) A$	10 year
C-113	$Q = \left(\frac{142}{\sqrt{A}} + 3 \right) A$	10 year

Definitions:

Q = Allowable runoff in cfs (cubic feet per second)

A = Drainage area in square miles

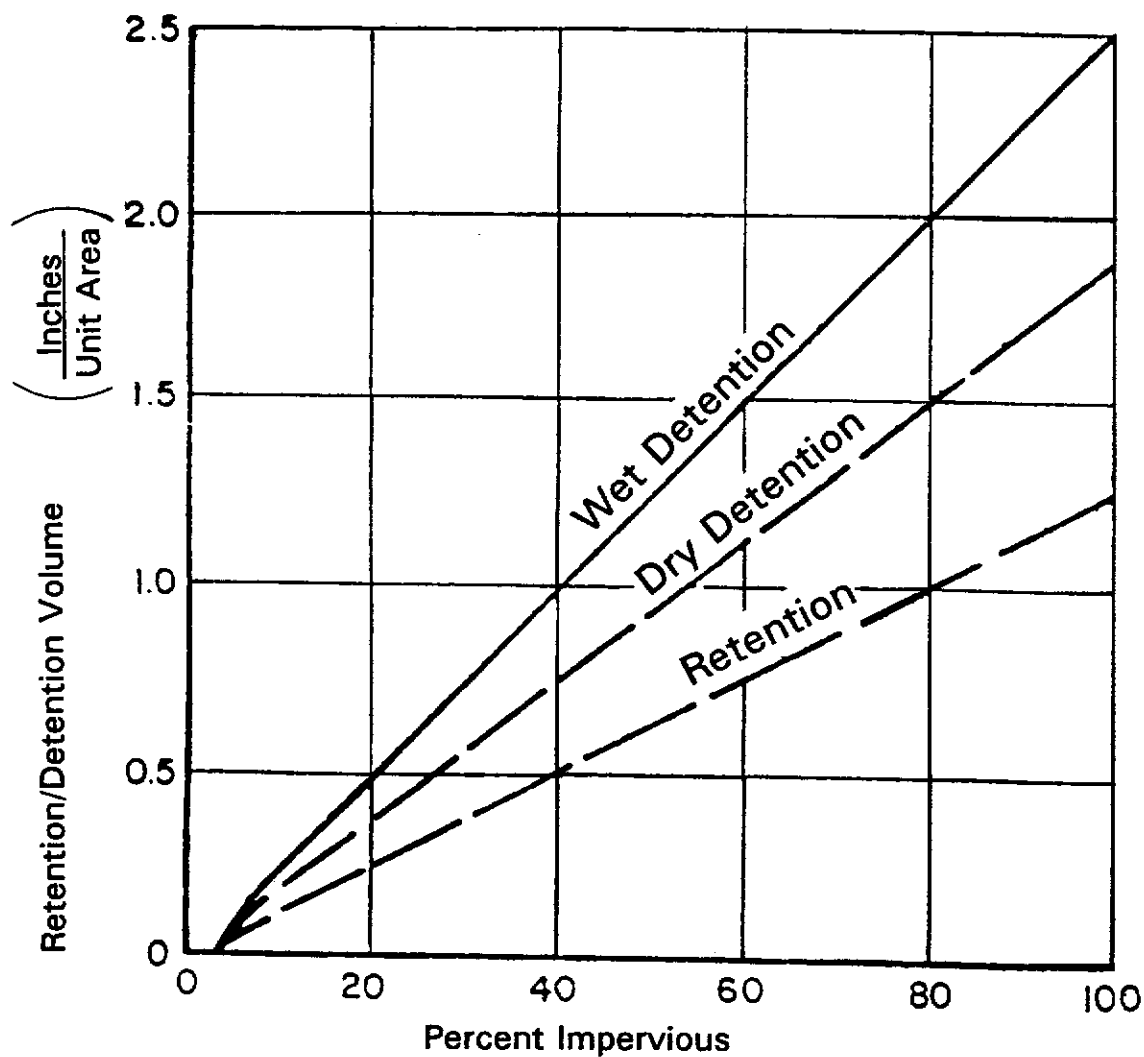
CSM = cfs per square mile

APPENDIX 3

URBAN RETENTION/DETENTION

Note: Storage Required Is In Addition To Normal Street & Lot Swales Which Have Already Been Accounted For In Preparation Of Curve.

(Reference: 3.2.2.2)



Separate Storage Required For Grass Swale Systems

APPENDIX 6

ABOVE GROUND IMPOUNDMENTS

Effective March 24, 1987

APPENDIX 6

ABOVE GROUND IMPOUNDMENTS

1.0 INTRODUCTION

1.1 Purpose

This Appendix to the South Florida Water Management District's Basis of Review for Surface Water Management Permit Applications has been prepared to elaborate on the criteria and standards applicable to above ground impoundments in accordance with the definition and requirements for "dams" in Part IV of Chapter 373, Florida Statutes. The content herein is not intended to be all inclusive of all possible situations, but is intended to provide guidelines and basic performance criteria wherever possible on design criteria for the situations commonly encountered for most typical south Florida situations. Because dam performance is a function of construction, operation and maintenance as well as design, information on those subjects is included. The basic responsibility for dam performance remains vested in the owner or permittee through appropriate representation by his engineer in accordance with State laws.

1.2 Classification

Upon request or application receipt District staff will classify impoundments or dams as "Major" or "Minor" for application review purposes in accordance with the following provisions:

1.2.1 Major - Impoundments located where failure would cause significant damage to the property of other than the permittee, could involve loss of human life, would create a public health hazard, or would cause irreversible environmental or water quality damage; maximum water depths above surrounding ground levels would generally exceed four feet.

1.2.2 Minor - Impoundments generally located in rural areas where failure would generally limit significant damage to the property of the permittee, would not involve loss of human life, would not create a public health hazard, and would not cause irreversible environmental or water quality damage; maximum water depths above surrounding ground levels would generally be limited to four feet, except where dam break analysis influence lines (six inch depth and two feet per second velocity) are limited to the land of the permittee and others, including the public, are not involved. It may be necessary that the permittee's land be legally restricted by such means as a unity of title to insure perpetual single ownership.

1.3 Certification responsibility

1.3.1 Major impoundments are considered to be individually engineered structures involving the disciplines of geotechnical, soils, foundation, and/or structural engineering and are therefore required to be certified in accordance with State law by individuals or firms expert in such disciplines.

1.3.2 Minor impoundments are considered to be general site improvements and may therefore be certified in accordance with State law as part of the overall surface water management system by individuals or firms with expertise in disciplines such as general civil and/or agricultural engineering.

1.4 Information submittals

1.4.1 Major impoundments require the submittal of all design, construction, operation and maintenance information necessary for complete review of the impoundment. Information to be submitted in addition to design calculations includes:

- a. Proposed construction schedule
- b. Safe filling and draining schedules
- c. Design of seepage and water level monitoring programs
- d. Operation and maintenance manual
- e. Influence lines for dam break analysis (6 inch depth and 2 feet persecond velocity)
- f. Emergency response and evacuation plan (if appropriate)

Review by the District will be done for purposes of confirming that reasonable assurances are offered that the intent of District policies and general engineering principles will be met. The review is not intended to supplant the certifying engineer's initiative, judgement, expertise, experience and/or responsibility. When necessary the District may retain outside expertise to participate in the review.

1.4.2 Minor impoundments require only the submittal of the usual surface water management permit information as enumerated in Appendix 1 (according to any specific standards herein) unless unusual circumstances exist. It is understood that the certifying engineer may perform calculations, tests, etc. for his/her own purposes or to meet State law and which may not be submitted.

2.0 DESIGN GUIDELINES

2.1 Major impoundments

2.1.1 Structural stability - All elements and appurtenant works for impoundments shall be designed for all possible conditions up to and including maximum water depths and in accordance with generally accepted engineering principles for such works, which include consideration of site preparation, construction materials, geological conditions, storm conditions, settlement, erosion, operation and maintenance and vandalism. More specific guidelines are as follows:

2.1.1.1 Dikes - Dikes shall be designed based on field test data of subsurface conditions and actual procedures and materials to be used in construction. Seepage and piping shall be considered and cutoff walls and toe drains included where necessary. Dimensions shall be such as to allow maintenance by normal equipment. Recommended side slopes for vegetated earth should be no steeper than 2 1/2:1 (horizontal to vertical) for external slopes and 3:1 (horizontal to vertical) for internal slopes. Top widths should be of sufficient width to allow safe vehicular access and no less than twelve feet. Dike toes should be continually

accessible by vehicle by relatively level toe berms of at least ten feet width. Dikes and toe berms should be widened at strategic points for vehicular turnaround or where necessary to load stockpiled material to be used for dike repair.

2.1.1.2 Structures - Discharge and other structures should be located to be accessible from the top of the dike during storm conditions for emergency operation and maintenance if necessary. They should be of permanent low maintenance materials, preferably reinforced concrete. The location and design should be such that dike integrity is maintained. Trash racks, seepage rings and vandalism protection should be included. A preferable design would consist of an inlet box which does not interfere with normal dike sideslopes and a conduit under the dike to an outfall endwall. Erosion protection, energy dissipators, etc. would be necessary at strategic points including the outfall.

2.1.2 Hydraulics - Unless more stringent criteria should apply because of other jurisdictional standards or unusual risks, the minimum District standards are as follows:

2.1.2.1 Maximum water depth as determined by routing a three day precipitation (distributed according to the Basis of Review, Section 4.2) through the inflow and outflow structures with rainfall on the reservoir. Three day precipitation amounts may vary between thirty six and fifty six inches depending on site specific conditions and risk management considerations. District staff will advise on request.

2.1.2.2 Design water depth - As determined by routing the project allowable discharge design event through the inflow and outflow structures with rainfall on the reservoir. The three day 25 year event should typically be used as a minimum.

2.1.2.3 Minimum freeboard above maximum water depth - Three feet minimum or that required to prevent overtopping or failure due to hurricane force winds as derived from the South Florida Building Code.

2.1.2.4 Discharge structure - Basis of Review allowable discharge for reservoir at maximum water depth with 100 year tailwater flood elevation, or Basis of Review allowable discharge for reservoir at design water depth and non-limiting tailwater, unless more accurate site specific tailwater elevations are applicable and substantiated by the applicant.

2.1.2.5 Return overflow - Impoundments must contain an outflow discharge structure which returns water to the area from which inflow occurs. Therefore a separate structure will be necessary for pump filled impoundments to allow return flow under the conditions of maximum or design water depths in the reservoir with pumps continuing to operate. For gravity filled impoundments this structure will actually be the inflow structure since reservoir and project stages will be the same.

2.1.2.6 Emergency discharge gates - Discharge structures should include emergency gates which can only be opened with District permission. Return overflow structures must include emergency gates to be operated at the discretion of the permittee or at the direction of the District.

2.1.2.7 Pumps - The pumps used to fill impoundments serving multiple owners, when allowed, should be multiple pumps of the same sizes to allow

interchange of parts. Electric pumps should have standby fuel operated power systems.

2.1.2.8 Seepage collection systems - A safety factor of three shall be utilized for hydraulic conveyance design purposes.

2.1.3.4 Floodplain encroachment and setbacks - Impoundments shall not be located within floodplains or shall otherwise provide compensation and setbacks as provided in Section 3.2.1.5 in the Basis of Review. Impoundments located in flat areas of diffused flow shall have the toe of dikes set back at least fifty feet from property lines to allow historic sheet flow to move around the impoundments. Greater dimensions or swale construction may be required if steep slopes, very large contributing areas, etc. would cause that dimension to be inadequate. Smaller dimensions may be allowed if the applicant can demonstrate smaller dimensions will suffice.

2.1.4 Environmental and water quality - The provisions of the Basis of Review apply. Since many impoundments are utilized for wetland management and/or mitigation, it may be necessary to set control elevations and emergency gate bottoms above natural ground levels in order to prevent wetland overdrainage.

2.1.5 Emergency repair material - Appropriate amounts of type, quantity and location of emergency repair materials shall be included in design plans.

2.2 Minor impoundments

2.2.1 Structural stability - The same general comments apply as for Major impoundments with specific guidelines as follow:

2.2.1.1 Dikes - Designs shall be in accordance with commonly accepted engineering principles and State laws. Dikes external to the permittee's property shall meet the dimensional and access criteria for Major impoundments to the degree necessary to meet the intent of Section 1.2.1. Internal dikes may be of lesser standards, but sideslopes should be no steeper than 2:1 (horizontal to vertical) and top widths no less than five feet.

2.2.1.2 Structures - Discharge and other structures should be as for Major impoundments.

2.2.2 Hydraulics - The same general comments apply as for Major impoundments with specific standards as follow:

2.2.2.1 Maximum water depth - The maximum water depth equals the design water depth as described for Major impoundments.

2.2.2.2 Minimum freeboard above maximum water depth - Equal to the maximum water depth dimensions but not less than two feet, nor more than three feet.

2.2.2.3 Discharge structure - Basis of Review allowable discharge for reservoirs at design water depth and non-limiting tailwater, unless more accurate site specific tailwater elevations are applicable and substantiated by the applicant.

- 2.2.2.4 Return overflow - Same as for Major impoundments.
- 2.2.2.5 Emergency discharge gates - Same as for Major impoundments except installation is optional.
- 2.2.2.6 Pumps - Same as for Major impoundments.
- 2.2.2.7 Seepage collection systems - Optional.
- 2.2.3 Floodplain encroachment and setbacks - Same as for Major impoundments.
- 2.2.4 Environmental and water quality - Same as for Major impoundments.
- 2.2.5 Emergency repair material - Optional.

3.0 CONSTRUCTION

Construction certification is a requirement of all permits for both Major and Minor impoundments, and it is therefore the responsibility of the certifying engineer to satisfy himself/herself and the State laws as to construction compliance with design. Changes to permitted design would require the need for As-Built plans to satisfy certification. Major changes, including changes to permit authorization or special or limiting conditions would require a permit modification prior to implementation. The District expects continual construction observation to be the minimum requirement necessary to evidence ability to perform certification on Major impoundments.

Certification must indicate that construction has been satisfactorily completed so that routine operation and maintenance may commence.

4.0 OPERATION AND MAINTENANCE

4.1 Reporting

Reporting of impoundment conditions, repairs, etc. will be a continuing process required by permit special condition. The District will indicate those general areas of interest for which reporting is required, but it is the basic responsibility of the permittee to initiate interim reporting and/or more detailed reporting as conditions change, emergencies or problems arise, etc. It is expected that Major impoundments will be reported in accordance with the operation and maintenance manual and emergency response and evacuation plan adopted at the time of permit issuance, with updates as necessary.

4.2 Primary subjects of interest

- 4.2.1 Major impoundments
 - 4.2.1.1 Dikes and seepage collection system

- a. Vegetation conditions
- b. Erosion
- c. Evidence of boils, piping, unusual seepage
- d. Slope stability, surface cracking
- e. Settlement
- f. Travelway conditions
- g. High and low water marks
- h. Presence of aquatic vegetation in supposed dry areas
- i. Monitoring system condition and monitoring data
- j. Adequacy and condition of emergency repair material
- k. Short and long term repair and modification recommendations

4.2.1.2 Structures and pumps

- a. Materials conditions
- b. Operational conditions
- c. Evidence of vandalism
- d. Settlement and erosion
- e. Freedom from trash problems
- f. Short and long term repair and modification recommendations

4.2.1.3 Impoundment area

- a. Vegetation changes
- b. Evidence of encroachment and misuse of land

4.2.1.4 Emergency response plan

- a. Land use changes in area of influence
- b. Topographic changes causing change in area of influence
- c. Changes in participants, addresses, phone numbers, etc. involved in emergency response plan
- d. Evidence of contact update with involved emergency management officials

4.2.2 Minor impoundments

4.2.2.1 Dikes

- a. Vegetation conditions
- b. Erosion, settlement, cracking, stability
- c. Short term repair and modification recommendations

4.2.2.2 Structures and pumps

- a. Structural conditions
- b. Operational conditions
- c. Short term repair and modification recommendations

4.2.2.3 Impoundment area

- a. Vegetation changes
- b. Evidence of encroachment and misuse of land

4.3 Typical special permit conditions

4.3.1 Upon completion of construction, or alteration the permittee shall submit a report to this District of engineering adequacy of all above ground dikes, levees and berms behind which water is to be contained and where failure could impact off-site areas. Such reports shall include proposal of technique and schedule for repair of any deficiencies noted, and shall be signed and sealed by a Florida registered professional engineer.

4.3.2 On a semi-annual basis (in May and December of each year), the permittee shall submit reports to this District of engineering adequacy of all above ground dikes, levees and berms behind which water is to be contained and where failure could impact off-site areas.

5.0 REFERENCES

Agencies with impoundment experience and publications:

- a. U.S. Army Corps of Engineers
- b. U.S. Department of Interior, Bureau of Reclamation
- c. U.S. Department of Agriculture, Soil Conservation Service